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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,597	09/29/2003	James J. Xie	0180227	2411

25700 7590 07/13/2005

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EXAMINER
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GURLEY, LYNNE ANN

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

**Office Action Summary**

Application No.

10/673,597

Applicant(s)

XIE ET AL.

Examiner

Lynne A. Gurley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 July 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 31 and 33-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 31 and 33-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.


**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
**LYNNE A. GURLEY**  
**PRIMARY PATENT EXAMINER**  
**TC 2800, AU 2812**

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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### DETAILED ACTION

This Office Action is in response to the remarks filed 7/5/05 in the Response to Final Office Action.

Currently, claims 31 and 33-40 are pending.

### *Response to Arguments*

1. Applicant's arguments, see pages 2-7, filed 7/5/05, with respect to the final rejection(s) of claim(s) 31 and 33-40 under 35 USC 102 and 35 USC 103 have been fully considered and are persuasive. Therefore, **the FINALITY of the rejection** in the previous office action **has been withdrawn**. However, upon further consideration, a new ground(s) of rejection is made in view of Singh (US 2003/0162399) and Yu (US 5,441,598). See below.

### *Specification*

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

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international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 31 is rejected under 35 U.S.C. 102(e) as being anticipated by Hall et al. (US 2004/0058546, dated 3/25/04).

Hall shows the method as claimed in a process where a high pH polish is conducted on a semiconductor interconnect during planarization and then the slurry dispense is terminated and a second polish is conducted with a rinse solution [0030], [0033]-[0034], [0041].

4. Claims 31, 35-37 are rejected under 35 U.S.C. 102(e) as being anticipated by Singh (US 2003/0162399, dated 8/28/03, filed 10/1/02).

1. Singh shows the method as claimed, in a method of using various slurries in intervals to planarize copper, tantalum, other metal interconnects and, associated barrier layers, in figures 1-9 and corresponding text, as: a silicon integrated circuit fabricated using a method of removing excess interconnect material (fig. 1, 3 [0005], [0009], [0015], [0032], [0038]) during fabrication of the silicon integrated circuit, the method of removing comprising the steps of: dispensing a slurry including abrasive particles and chemical on a sample having the excess interconnect material (Cu interconnect [0043], [0046]-[0047], [0051], [0054]); polishing the sample with the slurry, using a polishing pad having a plurality of pits, to remove the excess interconnect material, wherein the abrasive particles and chemical become embedded into the plurality of pits of the polishing pad (See paragraphs [0138] for polishing pad made. The pad inherently has pores or pits which trap the slurry, the abrasive particles and the excess interconnect material as polishing occurs); reducing the dispensing of the slurry after the polishing for a first period of time, wherein the dispensing of the slurry is reduced to a stop (the interval slurry is started and

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then stopped ([0136], [0141], [0048], [0054]); and polishing the sample using the polishing pad for a second period of time to remove the excess interconnect material (the continuing slurry is used to complete the CMP process, or a combination of the continuing slurry and the interval slurry is used at subsequent times. See Examples, pp. 14-16). The method is selective to the metal materials using optical sensors [0143] (which inherently takes into consideration the endpoint detection and thickness of the interconnect material).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 33-34, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Singh (US 2003/0162399, dated 8/28/03, filed 10/1/02) in view of Yu.

Singh shows the method substantially as claimed and as described in the preceding rejection of claims 31, 35-37 under 35 U.S.C. 102(e).

Singh lacks anticipation only in not teaching the limitations concerning ALD; and, the creation of the pits in the pad by polishing the pad with an abrasive disc.

Yu teaches creating pits of various shapes and sizes in the polishing pad used for CMP processing (column 1, lines 24-48; column 2, lines 39-50; column 3, lines 20-30; column 4, lines 18-67). The method imparts an increased control over polishing characteristics.

It would have been obvious to one of ordinary skill in the art to have had the limitations concerning ALD; to have used optical reflectivity; and to have created the pits in the pad by polishing the pad with an abrasive disc, in the method of Singh, with the motivation that the silicon integrated circuit including a metal (Ta) gate being fabricated by ALD is conventional in that ALD is a well known process of depositing metals, especially since Singh teaches planarization of metal gates [0012] and Ta as a metal; with the motivation that the endpoint detection and optical reflectivity are conventional processes to determine when the CMP process is finished; and with the motivation that Yu teaches that creating the pits in the polishing pad imparts an increased control over polishing characteristics.

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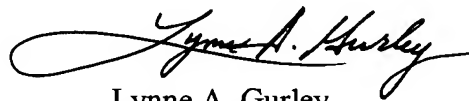
*Conclusion*

2. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See the PTO Form 892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne A. Gurley whose telephone number is 571-272-1670. The examiner can normally be reached on M-F 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lynne A. Gurley  
Primary Patent Examiner  
TC 2800, Art Unit 2812

LAG  
July 9, 2005